Amendments to the Drawings:

The attached sheet of drawing includes changes to Figure 2. This sheet, which includes Figure 2, replaces the original sheet including Figure 2.

Applicant would like to correct the typos in Figure 2. In step 106 of Figure 2, the numeral 52 is replaced with 62 and "VALVE 72 OFF" is replaced with "VALVE 72 ON".

The specification of the instant application fully supports the amendments, specifically, paragraph [23]: "In step 106, after a pre-determined thickness of BTBAS-based silicon nitride films is deposited onto the wafer, the LPCVD is terminated. At this phase, the control valve **62** is off, while the control valve 72 is now turn **on**." and claim 1: "upon completion of said silicon nitride deposition process, **interrupting** said BTBAS supply piping line and **opening** said initially interrupted bypass line".

Attachment: Replacement Sheet 1 page

REMARKS/ARGUMENTS

Reconsideration of the instant application and favorable action are solicited. In order to more particularly point out and distinctly claim that which the applicants regard as their invention, claim 1 has been amended. It is respectfully noted that the amendments to claim 1 are fully supported by the specification of the instant application, for example, paragraph 22 and FIGS. 1-2. No new matter is introduced.

1. Rejection of claim 1 under 35 U.S.C. 103(a):

Claim 1 was rejected under 35 U.S.C. 103(a), for reason of record that can be found on pages 2-6 in the Office action identified above. Claim 1 was rejected because of Laxman et al (U.S. Patent 5,976,991, hereinafter '991), Takahashi (U.S. Patent 5,517,943, hereinafter '943) and Kaizuka et al (U.S. Patent 6,436,203, hereinafter '203).

Response:

Examiner alleges that it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have performed the method of '991 using the apparatus of '943 as modified by the bypass mechanism of '203. The applicants respectfully disagree and respectfully request reconsideration.

'991 discloses a method for depositing silicon nitride and silicon oxynitride using bis(tertiarybutylamino) silane (BTBAS) precursor. '991 teaches that the presence of BTBAS precursor helps the surface reaction pathways and hence the deposited films have a superior uniformity when compared to other processes, even at lower temperatures. In col. 7, lines 29-43, '991 discloses a horizontal tube hot wall reactor is typically employed for depositing poly-Si, silicon nitride and silicon dioxide films, and that the vertical flow isothermal LPCVD reactor is used for deposition of silicon dioxide, and an appropriate vacuum system is necessary to induce the low pressure conditions in the reactor.

In col. 7, lines 58-64, '991 merely teaches that the deposition experiments were carried

out in a horizontal tube reactor, but the deposition with this precursor will occur even in a vertical tube reactor, and merely teaches that the precursor was fed through an open port near the load door. Reactant gases were also fed from a port near the door of the furnace independently.

'943 discloses a vacuum CVD apparatus and a method of cleaning the vacuum CVD apparatus, which allows cleaning for each batch of semiconductor film deposition without requiring the part to be cleaned to be disconnected from the system. The vacuum CVD apparatus taught by '943 includes a horizontal tubular furnace 3, a reaction gas source 6 for supplying silane gas, a reaction gas source 7 for supplying PH_3, a carrier gas source 8, and a cleaning gas source 20 (FIG. 1). The gas sources 6-8 and 20 are connected to a gas introduction pipe 15A. The gas introduction pipe 15A has two ends that are connected to vacuum flanges 4a and 4b respectively. The vacuum CVD apparatus taught by '943 further includes a vacuum pipe 16A connected to a vacuum pump 19. The vacuum pipe 16A also has two ends that are connected to vacuum flanges 4a and 4b respectively.

'943 merely teaches that the film deposition is carried out in two phases. In the first phase of the film deposition, the gas introduction valve 15a is opened while the gas introduction valve 15b is closed and, at the same time, the gas discharge valve 16b is opened while the gas discharge valve 16a is closed, so that the gases are introduced through the gas introduction valve 15a and discharged through the gas discharge valve 16b. In the second phase, the paths of introduction and discharge of the gases is switched in the flip-flop-like manner. Namely, the gas introduction valve 15b is opened while the gas introduction valve 15a is closed, and the gas discharge valve 16a is opened while the gas discharge valve 16b is closed. '943 also teaches that the cleaning operation is conducted in a similar valve switching manner. Either way, after the film deposition is completed, the reaction gas remained in the supply pipe and the cleaning gas will flows into the furnace.

'203 discloses a CVD apparatus and merely teaches bypass lines of raw material supply systems 20 and 40. The bypass line 36 is constituted of a pipe line branched from the switching valve 28 of the Al raw material supply line 21 and a pipe line branched formed the

switching valve 31 of the bubbling line 25 (col. 5, lines 60-65). Referring to FIG. 1 and FIG. 2, the bypass line 36 connects the bubbling line 25 with the Al raw material supply line 21 thus bypasses the bubbler vessel 22. '203 teaches that when the valve 28 is opened, the valve 29 of the raw material supply system 20 is closed (col. 7, lines 21-32). When the valve 29 within the raw material supply system 20 is closed, the remaining reaction gas in the pipe segment (downstream from valve 29) between the furnace and the raw material supply system 20 CANNOT be evacuated by way of the bypass line 36 within the raw material supply system 20.

'203 also teaches, referring to col. 8, lines 54-60, "...if the Al raw material gas is co-present with the Cu raw material gas in the chamber 1, the gases may react with each other and generate a reaction product. To prevent the reaction, it is preferred to employ either a method in which the chamber is purged with H_2 gas supplied from the purge gas source 33 after the Al raw material gas flow is switched to the bypass line 36, or a method in which after the Al raw material is exhausted by a vacuum pump, the Cu raw material gas is supplied into the chamber 1". No matter which method is employed, the Al raw material remaining in the Al raw material supply line between the raw material supply system 20 and the chamber 1 is evacuated by way of the chamber 1, but not by way of the bypass line 36.

In light of the above, the applicants assert that the prior art of record neither teach nor make obvious the claimed limitations of the instant application as a whole as recited in the once-amended claim 1. In particular, none of the prior art teaches or suggests "upon completion of said silicon nitride deposition process, interrupting said BTBAS supply piping line and opening said initially interrupted bypass line to evacuating said BTBAS from said BTBAS supply piping line between said tubular furnace and a BTBAS supply source by way of said bypass line instead of by way of said tubular furnace."

The applicants would like to point out that the claimed method invention of the instant application aims to provide a solution to the longstanding and unsolved particle problem originated from the gaseous BTBAS substances remaining in the segmental piping line 32 (FIG. 1) located between the furnace 12 and the BTBAS source 52.

Specifically, referring to paragraph [21] of the present invention, "...The control valve 62 is preferably situated adjacent to the base portion 16 as near as possible..." and further in view of the paragraph [22] of the present invention, "By doing this, the gaseous BTBAS substance remaining in the piping line 32 will not enter the furnace 12 in...The remaining gaseous BTBAS substances are evacuated from the LPCVD system by way of the bypass line 70 instead of by way of the furnace 12, thereby alleviating or preventing the particle problems".

In light of the above, the applicants believe that claim 1 contains distinct features that distinguish the applicants' invention from the cited references and therefore claim 1 is allowable. Reconsideration of the once-amended claim 1 is politely requested.

2. Rejections of claim 2-4 and 6-9 under 35 U.S.C. 103(a):

Claims 2-4 and 6-9 were rejected under 35 U.S.C. 103(a), for reason of record that can be found on pages 2-8 in the Office action identified above.

Response:

As claims 2-4 and 6-9 are dependent on claim 1, they should be allowed if claim 1 is allowed. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Sincerely yours,

Winston Hsu

Date: 09.28.2007

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Note: Please leave a message in my voice mail if you need to talk to me. (The time in D.C. is 12 hours behind the Taiwan time, i.e. 9 AM in D.C. = 9 PM in Taiwan.)